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A case of mono-microbial Klebsiella pneumoniae liver abscess in a metropolitan region of Australia

Case Report

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Abstract: This documented case of mono-microbial Klebsiella pneumonia liver abscess with pulmonary metastasis in an adult in metropolitan Australian evokes important epidemiological, clinical and microbiological issues. These include the increasing incidence of this disease in western society, predisposing conditions, variability of presentation and the virulence of *Klebsiella pneumonia*.

Keywords: *Klebsiella Pneumonia* • *Liver abscess* • *Mono-microbial* • *Diabetes*

1. Introduction

Pyogenic liver abscesses are uncommon. Previously, *Escherichia coli* (E.coli) was recognized to be one of the most frequent isolates from pyogenic liver abscesses, often in consort with a mixed anaerobic flora reflecting an intestinal origin. Mono-microbial isolations have often reflected limitations of earlier bacteriological methods rather than accurate descriptions of the underlying process. However, in recent times, mono-microbial infection with *Klebsiella pneumoniae* has been increasingly documented in literature as a distinct emerging infectious disease [1,2]. Substantial case numbers have now been reported from Korea, Singapore, Japan, India, Thailand and especially Taiwan where it is believed to be endemic [1,3,4]. Occasional cases have also been reported from Australia [5].

We report the case of a 56 year-old Tongan male with Type 2 diabetes mellitus, who survived a mono--microbial *Klebsiella pneumoniae* liver abscess with a septic pulmonary metastasis in metropolitan Australia.

2. Clinical Record

This patient presented with a 2 week history of a cough, productive of clear sputum, and intermittent fevers. He was initially seen by his GP who had commenced him on a course of oral amoxicillin for a presumed bacterial chest infection. However, his condition deteriorated and he began to complain of lethargy, malaise and anorexia. Upon presentation to the emergency department, he was primarily complaining of shortness of breath.

He has been a Type 2 Diabetic for 15 years for which he took metformin 1gm twice daily and glibenclamide 10mg twice daily. He also took atorvastatin 20mg once daily for hypercholesterolemia. He complained of no other symptoms. He had immigrated to Australia almost 20 years ago from Tonga and has no left the country for more than 10 years and lives with his wife who has been well.

On examination, upon arrival to the emergency department, his temperature was 40.8°C, pulse 110 beats/min, blood pressure 130/70, blood glucose 25.0 mmol/L,

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oxygen saturation at room air was 93% and Glasgow coma scale 15/15. The patient was in a Systemic Inflammatory Response Syndrome (SIRS). The remainder of his examination was unremarkable. Specifically, there was no abdominal tenderness or guarding. Laboratory results revealed hyponatremia 130 mmol/L, hypoalbuminemia 25 g/L, total bilirubin 22 µmol/L, alkaline phosphatase 180 U/L, gamma-glutamyl transferase 194 U/L, alanine transaminase 71 U/L, aspartate transaminase 58 U/L, C-reactive protein 165mg/L, haemoglobin 119 g/L, white cell count 7.7 x 10^9, neutrophils of 7.35 x 10^9 and decreased lymphocytes level of 0.28 x 10^9. The HbA1c (National Glycohemoglobin Standardization Program (NGSP)) was 11.5% (4.3-6.0%).

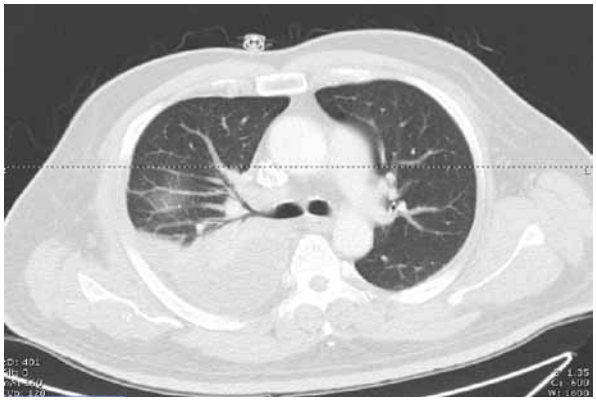
The chest X-ray did not show any abnormality. Within 2 hours, the aerobic and anaerobic culture bottles grew a mucoid, non-motile, indole negative gram negative rod identified as *Klebsiella* pneumonia. He was admitted to the ward and prior to the sensitivities being available, he was commenced on intravenous timentin 3.1 g thrice daily, metronidazole 500mg thrice daily and benzylpenicillin 1.2 g 6-hourly.

The following day an ultrasound of the liver performed because of the non-specific nature of his fever and the abnormal liver function tests and raised CRP revealed the presence of a large hepatic abscess. Computed tomography confirmed the presence of an irregular hypodense hepatic abscess measuring 8cm x 8cm in segments VII and VIII (Figure 1).

Using ultrasound and fluoroscopic guidance, a 10 French pigtail drain was inserted to drain the abscess. A total of 125-150cc of frank purulence was aspirated. A sample from the abscess also grew *Klebsiella* Pneumonia susceptible to all cephalosporins, co-amoxyclav, ticarcillin-clavulanate, ciprofloxacin and cotrimoxazole. The antibiotic regime was ceased and he was then commenced on intravenous cefrtiaxone, 2gm once daily. The patient was on an insulin/glucose infusion before recommencing his oral glycaemic agents on day 5 of admission.

Figure 1. CT abdomen illustrating location of abscess

Figure 2. CT Chest: a pleural collection on the right side



4 days after admission and intravenous antibiotics therapy, he continued to spike low-grade fevers of 38.3°C and 38.2°C, and C- reactive protein remained elevated. His dyspnoea worsened and he had now developed some tenderness over the right lower thoracic and right upper quadrant of the abdomen. Auscultation revealed course mid to late inspiratory crackles in the mid and lower zones of the right lung. A CT of his chest showed a moderate to large pleural collection as well as right lower lobe collapse (Figure 2). Repeat percutaneous drainage failed to aspirate any fluid.

Within a week of admission 2 repeated blood cultures were negative. Eight days later, a repeat culture of the drain fluid showed scant *Klebsiella pneumonia* but subsequent cultures failed to grow the organism.

Despite slow recovery initially, after 23 days of intravenous antibiotic therapy and other supportive measures, his clinical condition was much improved. Serial ultrasounds showed a regression in abscess size and he was discharged on the Home IV program for a further 4 weeks of intravenous therapy with ceftriaxone 2 grams per day.

3. Discussion

Reports of *Klebsiella pneumoniae* liver abscess (KLA) have been increasing in western countries, as well as in East Asia [1,3,4]. The prevalence KLA reported in case series of pyogenic liver abscess in Taiwan has risen from 30% in the 1980's to over 80% in the 1990's. Most of these patients have diabetics (>70%) and have no history of hepatobiliary disease [3]. A study from Taiwan which compared pyogenic liver abcesses caused by non-*klebsiella pneumonia* (usually polymicorbial) and *Klebsiella pneumonia* (mono-microbial), found that

the prevalence of diabetes mellitus was higher in the Klebsiella group (70.2% vs. 32.5%; p<0.001), further highlighting that having diabetes is a predisposing factor [4]. These findings highlight a strong correlation between KLA and diabetes.

The majority of patients who develop KLA in regions outside Asia are of Asian ethnicity suggesting a genetic predisposition to be developing these infections [6]. However, cases such as this one suggest those from other ethnic origins are also vulnerable.

Primary KLA is believed to be more likely to metastasize then non-*klebsiella* bacterial liver abscesses [3,6]. The common sites of metastatic infection for KLA include endophthalmitis, meningitis and brain abcesses. Other sites include pleural empyema, septic pulmonary emboli, pneumonia and prostatic abscess. Despite treatment, the mortality rates are reported to be between 5.2 to 18.8% [4,7,8]. In this case, it is difficult to ascertain whether the pulmonary effusion was a transdiaphragmatic effusion or as a result of hematologic spreading or even a combination of both. However, this discussion does not explore the pathogenesis of this disease.

Patients with KLA often have non-specific constitutional symptoms such as fever and fatigue [2,4]. Less than half patients present with more specific signs such as right upper quadrant pain, jaundice or hepatomegaly. Approximately 13-14% of patients present with respiratory symptoms such as cough, dyspnea or chest distress [4]. Therefore, it should also be a diagnosis which physicians must consider in cases of pyrexia of unknown origin.

In conclusion, this case study highlights that mono-microbial *klebsiella pneumonia* liver abscess is an emerging disease in the western countries. Secondly, KLA should be a considered not only in those with east Asian ethnicity but anyone with fever, poorly controlled diabetes and abnormal liver function, even in the absence of symptoms initially referable to the liver. And finally the recovery from the blood of a person with diabetes mellitus of a highly mucoid, facultative anaerobic Gram negative rod which is non-motile and indole negative should alert the clinician to the possibility that the infection may be due to a highly invasive *Klebsiella pneumoniae* with the potential to produce severe metastatic infectious complications.

4. Conflicting Interest

Nil

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